

And in this corner...

That opponent of peanut profits, aflatoxin, has met its match as a biological pesticide gets closer to the field.

The ability of the peanut industry to manage aflatoxin contamination could take a major step forward this season if

U.S. Environmental Protection Agency grants registration of Afla-Guard for aflatoxin control. Afla-Guard, the result of many years of research at the USDA/ARS National Peanut Research Laboratory in Dawson, Ga., is a combination of nontoxic *Aspergillus flavus* spores and barley seeds. The product has produced reductions in aflatoxin ranging from 70 percent to 90

percent in multiple years of studies conducted by microbiologist Joe Dörner.

Aspergillus flavus and *Aspergillus parasiticus*, which occur naturally in the soil, infect peanut plants, producing the carcinogenic aflatoxins that destroy peanut quality, cause problems for shellers and make the nuts unsafe for human consumption. As part of an aflatoxin research team at the NPRL since 1980, Dörner was one of the researchers who helped define the root causes of aflatoxin contamination. Further efforts by the team led to the discovery of a naturally-occurring strain of *A. flavus* that cannot produce aflatoxin, but when applied at the right levels, competitively excludes the toxin-producing strains of *A. flavus* and reduces the levels of aflatoxin in peanuts.

Nontoxic *Aspergillus*

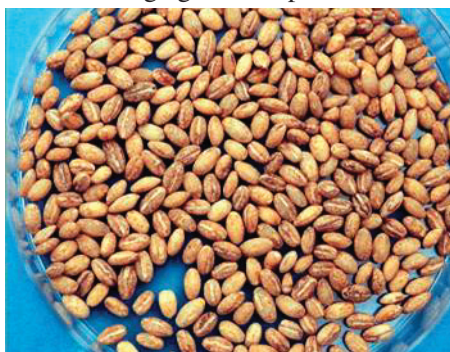
Dörner's team perfected the new technology over the years, and it is now ready for commercial production. *A. flavus* spores are coated onto the surface of hulled barley using soybean oil, though any vegetable oil could be used,

including peanut oil. The barley is then coated with diatomaceous earth so the spores dry and cling to it long enough for the spores to reproduce. Why was barley chosen?

"[It] is a carrier and a substrate for the fungus to grow on. Fungal spores germinate readily on it, it is cost-effective, and the surface area is maintained long enough for spores to grow and reproduce themselves," Dörner says. "Also, the particle size of barley is uniform, unlike other grains such as corn. Benefits of this process include minimum costs for raw materials and the spore-coating process itself, which alleviates problems associated with other production methods that require sterilization, fermentation and drying, which could kill the spores."

In the field in 2004?

Afla-Guard will be sold to shellers who will supply it to growers. Plans call for 8,000 to 10,000 acres in Georgia and Alabama to be treated this year. The product is seeded into the soil around the peanut plant and colonizes in the pod



Photos courtesy of Joe Dörner

Hulled barley is coated with *A. flavus* spores using soybean oil and diatomaceous earth.

zone, blocking the aflatoxin-producing fungi.

The labeled application rate will likely be 20 pounds per acre applied in a 10-inch to 12-inch band over the row, similar to a Lorsban application. Future research plans call for a study of varying application rates and methods.

And the good news continues. Tests have shown that the more the product is used, the greater the future residual impact. It remains to be seen whether the residual level will be enough to let producers apply less product in subsequent years.

The company

USDA worked on this project nearly 20 years and, in 2002, invited companies to apply for a license to produce and distribute the product. Only one company applied—Circle One Global in Cuthbert, Ga.

Dan Gay, Circle One Global president and owner of Riverside Peanut Co., is excited about the future of Afla-Guard. Not only can it be used in the field, but also peanuts treated with the product show 90 percent to 95 percent reduction in aflatoxin in the warehouse.

“We set up a 10,000-square-foot plant this week [of April 26] and will have cold storage facilities for the product in Blakely, Ga.,” Gay says. “We can store at 55 degrees Fahrenheit for nine to 12 months.” He says that six shellers are working with the company this year to prove the commercial viability of the product.

Circle One Global holds an exclusive world license for Afla-Guard and is in the first year of a three-year research project with USDA looking at aflatoxin in corn. Future research includes a pistachio study slated to begin in 2005. Other opportunities abound as scientists find stronger links between mad cow disease and high levels of aflatoxin.

The company soon will file an amendment with the EPA for aerial application in 2005.

The shellers

Though good news for shellers, Afla-Guard may make things difficult for them initially. The product causes a nontoxic fungus that is left on the harvested peanuts. According to grading rules in the 2002 farm bill, this means an immediate Seg. 3 grade if visual testing at the buying point shows *A. flavus* present. Legislation is under development granting automatic Seg. 1 grades to peanuts produced using the product. For the 2004 season, shellers will guarantee Seg. 1 prices for Afla-Guard peanuts.

Joe Campbell, head of procurement for Golden Peanut, is optimistic about Afla-Guard. “It has good potential to help with aflatoxin in dryland areas,” he says. “Peanut buyers have heard a lot about this product over the last six to eight years.”

Dennis Finch, of Anderson Peanuts in Opp, Ala., is also confident about Afla-Guard. “I think it’s a great product and something we’ve needed for a long



*Barley seed sporulated under the peanut canopy three days after Afla-Guard was applied. These *A. flavus* spores will disperse into the soil, where the fungus will competitively exclude the aflatoxin-producing strains of *A. flavus*.*

time,” he says. “The issue we will have after this year is deciding who will pay for this product. Producers do not have the same incentive to use it as they would have with a quota program. In a dry year, those who use it will have a better crop; but in a normal year, those who use it will have spent a lot of money unnecessarily.”

Finch plans to supply Afla-Guard for 2,000 acres at one of his buying points in Hartford, Ala., in Geneva County. The cost for this year is \$40,000.

Certification

Gay says that talks are under way with USDA for developing a certification program for peanuts produced using Afla-Guard. Dorner says, “There are some who are thinking about how to deal with loads of peanuts from treated fields that might show up with visible *A. flavus* during grading but that may not be contaminated with aflatoxin. The *A. flavus* being used for biocontrol can’t be distinguished visually from toxin-producing strains, and an inspector would not be able to tell the difference. You wouldn’t want a load to be graded Seg. 3 if it is not contaminated. A certification program could be designed to let buyers know if the peanuts were coming from an [Afla-Guard]-treated field, and those peanuts might not be subject to visual inspection for *A. flavus*.”

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